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ABSTRACT

This study investigated the decline in rate of development often observed in disadvantaged children, and compared the effectiveness of different types of intervention designed to prevent this decline. Approximately 125 infants from both middle and lower class backgrounds were recruited as subjects. Each infant was assigned to one of four experimental groups in which one of the following procedures was used: (1) testing of the infant with age-appropriate measures at 6, 12, 24, and 36 months of age; (2) testing of the infant every month from 8 through 12 months, and then quarterly from 12 to 36 months; (3) testing as in group 2 and experimental intervention by suggesting and demonstrating activities and toys which were given to the mother to help the baby "learn new things" in some developmental areas; or (4) testing as in groups 2 and 3 and home intervention in which the target was the parent-child unit who received biweekly tutoring sessions. The results contained in this preliminary report indicate that the predicted decline in developmental test scores did occur, and that neither of the intervention strategies were effective in circumventing it. (SDH)

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The Longitudinal Observation and Intervention Study: A Preliminary Report[1]

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The purpose of the longitudinal observation and intervention study being conducted at the Center for Early Development and Education is to explore the very important scientific question of exactly when the decline in rate of development so often observed in children from disadvantaged circumstances begins, and to compare the effectiveness of different types of intervention in preventing this decline. This study thus represents a continuation of the work begun in Syracuse by Caldwell and Richmond (1967, 1968), by Caldwell, Wright, Honig, and Tannenbaum (1970) and by the work of persons such as Golden and Birns (1968), Bayley (1965), and others who have been concerned with behavioral development during the first few months and years of life. Studies of the development of infants from all types of social backgrounds have revealed no measurable differences during the first year (Knoblock and Pasamanick, 1953), up to 15 months of age (Bayley, 1965), and at 24 months of age (Golden and Birns, 1968). Yet comparative studies of children aged three and above from different social class backgrounds have consistently shown a difference in favor of the more socially and economically priviledged children. This has suggested that the age at which divergence of developmental curves begins is somewhere between 24 and 36 months of age. More recently, Wachs, Uzgiris, and Hunt (1971) have documented that such differences occur as early as seven months of age.

If we assume that this pattern of developmental decline found among disadvantaged infants is due in the main to a failure of the environment to support development, then several important research questions present themselves.

(1) Precisely when does the decline begin?

(2) In what kinds of functions does it first appear?

(3) What can be said about the effectiveness of different types of intervention in preventing the decline?

With the present study we are seeking answers to the preceding questions.

Method

Recruitment of the subjects for this study began in November 1970. Well-baby clinics, birth records from hospitals, and personal contacts in the community all served as sources of subjects, who were drawn from both middle and lower class backgrounds.

Each infant was assigned to one of four groups. Each group, which consists of 30-32 infants, is receiving a different level of educational intervention.

Level 1 consists solely of testing the infant with age-appropriate measures (The Bayley Scales of Infant Development or the Stanford-Binet) at 6, 12, 24, and 36 months of age. All testing is done in the presence of the mother.

Level 2 consists of testing the infants every month from 8 through 12 months and then every three months from 12 to 36 months.

We feel that the administration of a developmental test does not technically constitute intervention but does afford mothers the opportunity to notice behavior which the examiner considers important. We wished to control for any modeling or "testing" effects and thus decided to have two groups that were tested -- one infrequently and one frequently.

Level 3 consists of testing the infant on the same testing schedule as Level 2. However, immediately upon completion of the testing, the mother is given some suggestions as to ways to help her baby "learn new things" and is given a paper bag full of toys to help her teach her baby. The paper bags also contain some very simple suggestions for style of interaction during the play sessions. The examiner demonstrates, with the toys contained in the bag, the kinds of teaching activities likely to

be of value to the child. The mother is not asked to return the toys. The toys and the suggested activities are, in effect, transfer items for each of the items found at a particular age range on the Bayley test. For example, the paper bag to be taken home from the eight-month examination by the parents in Level 3 contains teaching suggestions based on Bayley test items found in the six- to nine-month range. Teaching activities are individualized and are based upon the infant's pattern of strengths and weaknesses as revealed on the Bayley test. Thus if the infant does well on the eye-hand coordination items but is below the norm in terms of social responsiveness, emphasis in the post-examination discussion is placed on the importance of the mother's playing with the baby, on encouraging him to smile, on smiling and talking to him when she feeds or changes him, and many other activities. If the child's achievement pattern is reversed, then the suggestions would emphasize the importance of letting the child have things to hold in his hands, on the importance of having the mother invest toys with her interest, etc. Thus, in so far as possible, the tutoring is tailored to each child's individual achievement pattern. All sessions are held in the testing room at the Center for Early Development and Education.

It is hoped that if this level of intervention proves successful, it could be easily adopted as an adjunct to well-baby clinics. Mothers could be instructed on how to teach their babies during the waiting periods for examination.

Level 4 infants are on the same frequent testing schedule as those in Levels 2 and 3. Intervention in this group is provided by home visits. In this group, an attempt is made to establish a relationship with the child's mother. The target of the intervention is the parent-child unit, not the child

alone. Home visitors are female college-educated research assistants and teachers, who provide a bi-weekly home tutoring program for the mother-child dyad.

As may be apparent, this level of intervention resembles rather closely the type of intervention now being launched by the Office of Child Development as Project HOME START. It should be remembered that Project HOME START is a home-based program for three-to six-year-olds, whereas our program is for 8 to 36-month old infants.

Infants were assigned to a particular level of intervention on the basis of scores on the Inventory of Home Stimulation (Caldwell, Heider, and Kaplan, 1966). This intentory is designed to sample certain aspects of the quantity and quality of social-emotional and cognitive support available to a young child within his home. The selection of items was guided by empirical evidence on importance of certain types of experience for nourishing the behavioral development of the child.

The primary objective that guided the development of this inventory was the desire to assemble a set of items to assess those somewhat intangible qualities of person-person and person-object interaction which collectively comprise the infants' learning environment. In the past the assumption has been made that the generic term "social class" adequately encompassed these quantitative and qualitative characteristics. The development of this Inventory represents a conviction that such a gross structural designation is insensitive to the cumulative transactions that occur daily between the infant and his environment and that an attempt to describe and measure these transactions will not only provide a more accurate description of the learning environment but will, in addition, help to pinpoint areas in which intervention is needed.

Therefore, scores on the Inventory of Home Stimulation served as the basis for assigning subjects to treatments in this study. An assignment was made so that the means and variances on the inventory for infants receiving each level of intervention were not significantly different at the outset of tne study, so that any obtained differences in infant development at the conclusion of this study can be attributed to the level of intervention.

In addition to the Inventory of Home Stimulation, other dependent measures include an Attachment Interview at 12, 24, and 36 months and the Preschool Attainment Record at 24 and 36 months.

These are the major hypotheses being tested in this study:

1. Differences between developmental patterns shown by children from homes differing in the amount of stimulation and support will appear some time between the ages of 8 and 36 months.
2. Children from homes low in stimulation and support for development at the outset of the project will show more response to the tutorial program than will infants from homes already high in stimulation.
3. The response of the infants to intervention will be greater in the intervention condition (Level IV) that encourages greater affective involvement of the mothers with the person offering the tutoring.
4. The effects of the tutoring experience will be reflected in the level of stimulation available in the home, i.e. it is predicted that scores on the Inventory of Home Stimulation will increase the most in Level IV, since it involves the most intensive intervention.

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Preliminary Findings

Table 1 contains data from the administration of the Bayley Mental Scale at ages 12 and 18 months. Level I, the group which receives infrequent testing, is not represented in this table because the majority of this group has not reached 24 months, which is their next evaluation period.

As can be noted from an inspection of Table 1, at Levels II, III, and IV there has been a decline in measured test performance. We must therefore conclude that to this point, we have not been successful in our intervention efforts. Both Level III and Level IV infants have done less well on the 18-month evaluation than on the 12-month evaluation even with intervention directed at the child's individual strengths and weaknesses.

Possibly the intervention efforts need to be more intensive. With our Level IV group, perhaps we should be making weekly (instead of bi-weekly) visits, as is the plan for the 15 centers funded under the HOME START program. There is also the possibility that the intervention efforts will have cumulative effects and if we can change the stimulation potential of the home we may see effects in later performance -- perhaps at the 24 month testing. In later analyses we will look for any changes in scores on the Inventory of Home Stimulation as a function of intervention.

In the future our hope is to compare our own Center for Early Development day care group of infants with the babies now being discussed. Presently, we have only a very small sample of group day care infants that have been with us for an appreciable time.

Summary

This paper has presented a preliminary report on the longitudinal study of infant development between the ages of 8 and 18 months, with data collection eventually going up to 36 months. At the time of the initial assessment infants were assigned to one of four groups which represent a hierarchy of intervention ranging from what might be considered minimal to moderate Babies in the first level are tested once a year; those in the second level are tested monthly to one year and then quarterly up to age three. For

infants in these two levels, no other intervention is offered. These levels were used in the design, however, as there is some evidence that having a mother observe an infant examination constitutes a minimal type of intervention. The infant examination is used as an entree for intervention with the infants in the third level. At the completion of the examination a set of learning materials geared to the child's strengths and weaknesses observed in the testing is given the mother to take home, together with simple (and hopefully appealing) suggestions as to ways of utilizing the materials. For the fourth level a staff member goes bi-weekly to the family home and interacts with both the mother and the baby, thus adding affective involvement with both mother and baby as an ingredient of the intervention format. On the basis of existing literature in the field, we feel justified in hypothesizing an effect associated with Level IV. Yet from the standpoint of potential service delivery patterns, we are in some ways more interested in Level III than in Level IV. That is, if one can affect development by this very inexpensive and brief type of educational contact, then it might be possible to reach greater numbers of infants than has previously been the case. A clinic delivery system, or even a periodic mail delivery of intervention suggestions and materials, would be within reach of all infants.

Results to date (approximately half way through the study) indicate that the predicted decline in developmental test scores is indeed occurring, and thus far none of the intervention levels has been effective in circumventing it. To date only total scores have been examined, and no examination of types of items on which decline first manifests itself has been made. Subsequent data will help clarify the interaction between home environment and development.

TABLE I

LONGITUDINAL OBSERVATION AND INTERVENTION STUDY (L.O.I.S.)
PRELIMINARY FINDINGS

BAYLEY MENTAL SCALES

	12 months	18 months	
LEVEL II	N = 29	N - 29	t = 1.33
	$\bar{X}$ = 96.7	$\bar{X}$ = 91.9	
	$\tilde{\sigma}$ = 21.4	$\tilde{\sigma}$ = 16.5	.10 < P < .20
LEVEL III	N = 20	N = 20	t = 2.17
	$\bar{X}$ = 97.0	$\bar{X}$ = 85.6	
	$\tilde{\sigma}$ = 18.6	$\tilde{\sigma}$ = 15.8	.02 < P < .05
LEVEL IV	N = 19	N - 19	t = 1.93
	$\bar{X}$ = 102.0	$\bar{X}$ = 94.4	
	$\tilde{\sigma}$ = 18.4	$\tilde{\sigma}$ = 20.3	.05 < P < .10